

# **Middle Kansas Phase II Kickoff**

**Middle Kansas Watershed RiskMAP  
Project**

**Kansas Division of Water Resources**

**THANK YOU FOR  
COMING!**

- This is the Kickoff to Phase II of the Middle Kansas Watershed floodplain mapping project.
- The first phase of the Middle Kansas project began last fall and has produced new floodplain data for most of Wabaunsee County and the City of Wamego.
- Phase II will address map panels not replaced in the 2012 Pottawatomie County FIRM update and remap the Kansas River in Pottawatomie County.
- A major challenge of this project phase will be to address levee accreditation in St Marys and Belvue
- **This should be informal and interactive.**

# INTRODUCTIONS

# AGENDA

- Intro
- Floodplain Mapping 101
- Project Overview
- Project Timeline
- Working Group Tasks
- Q&A

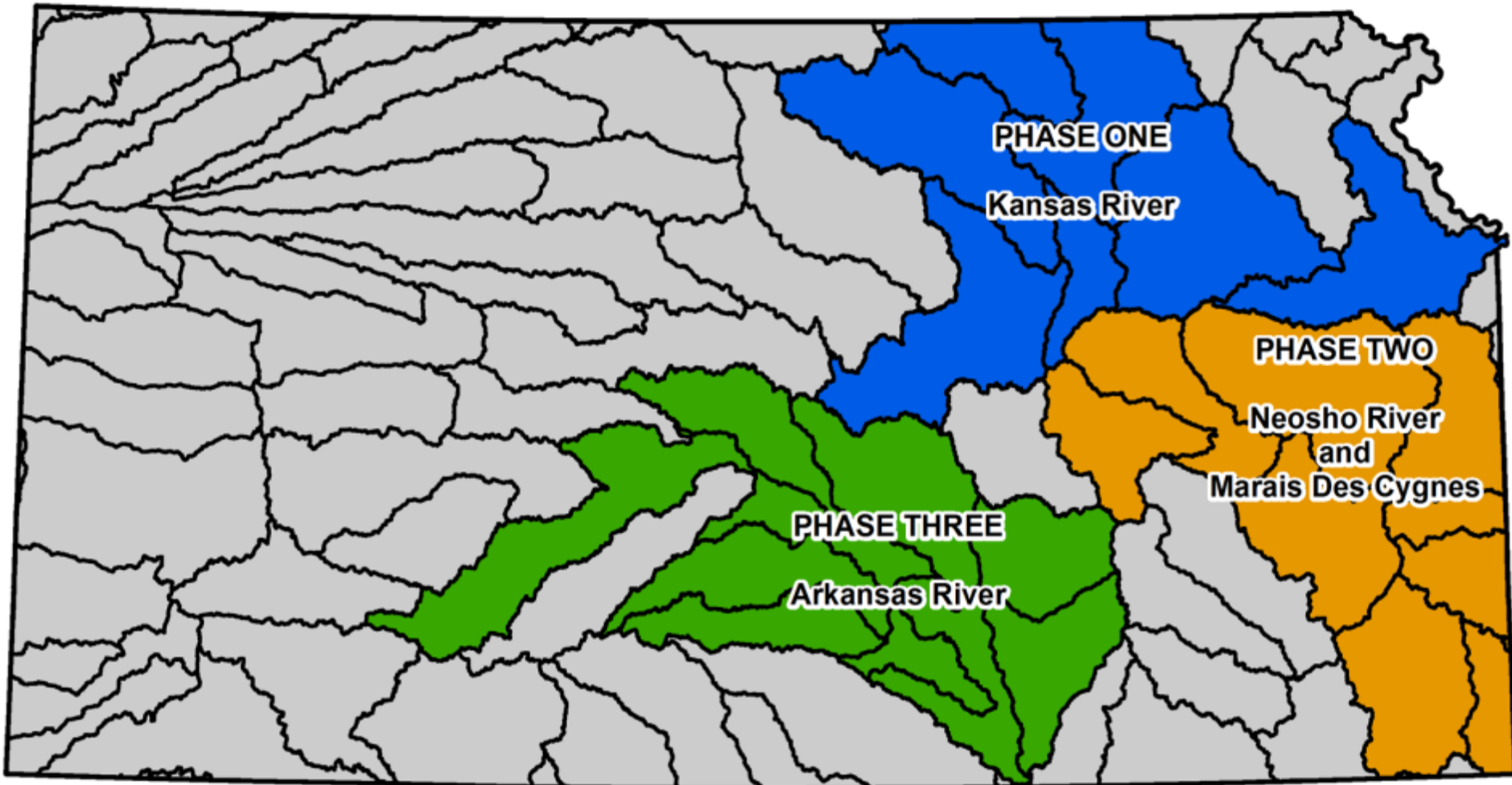
# WHY?

- **Watershed “Discovered” in 2015**
  - Discovery Meeting – Nov 19, 2015 - Wamego
- **Outdated Engineering**
  - LiDAR (Wabaunsee County)
  - Hydrology
  - Invalid in CNMS (FEMA database)(Wabaunsee County)
- **Community Involvement** – City of Wamego, Wabaunsee County

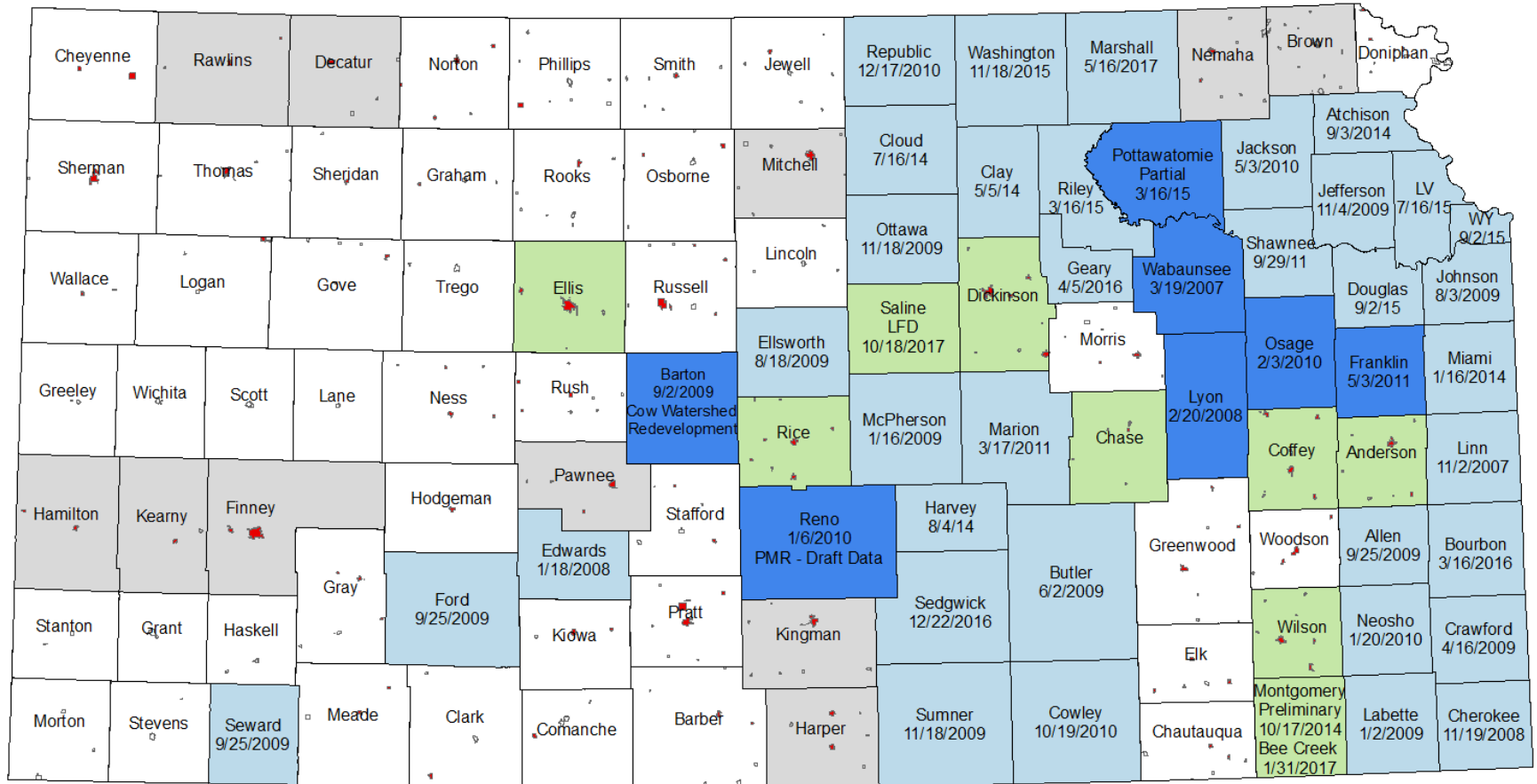
## WHY PHASE II?

- **Map panels not addressed in 2012 (3)**
- **Match Kansas River floodplain in Pottawatomie County with new Wabaunsee County mapping. (So both sides of the river match)**

# RiskMAP Phased Approach



# Kansas Floodplain Mapping Status



October 23, 2017

## Modernized DFIRM

- Effective DFIRM
- Effective DFIRM with Redevelopment
- DFIRM Under Development

## Not Modernized FIRM

- County-Wide Available

## Cities with SFHA Identified

- Yes
- No

Dates reflect the most recent study and may vary by location within a county  
Consult the watershed map for watershed projects





# Why Have Floodplain Maps?

- Determine where flood insurance is needed and rate its cost.
  - Flood Insurance Rate Map (FIRM)
- To provide the basis for executing community floodplain management ordinances.
- Understand flood risk so communities can make informed planning decisions.

# What Is Risk MAP?

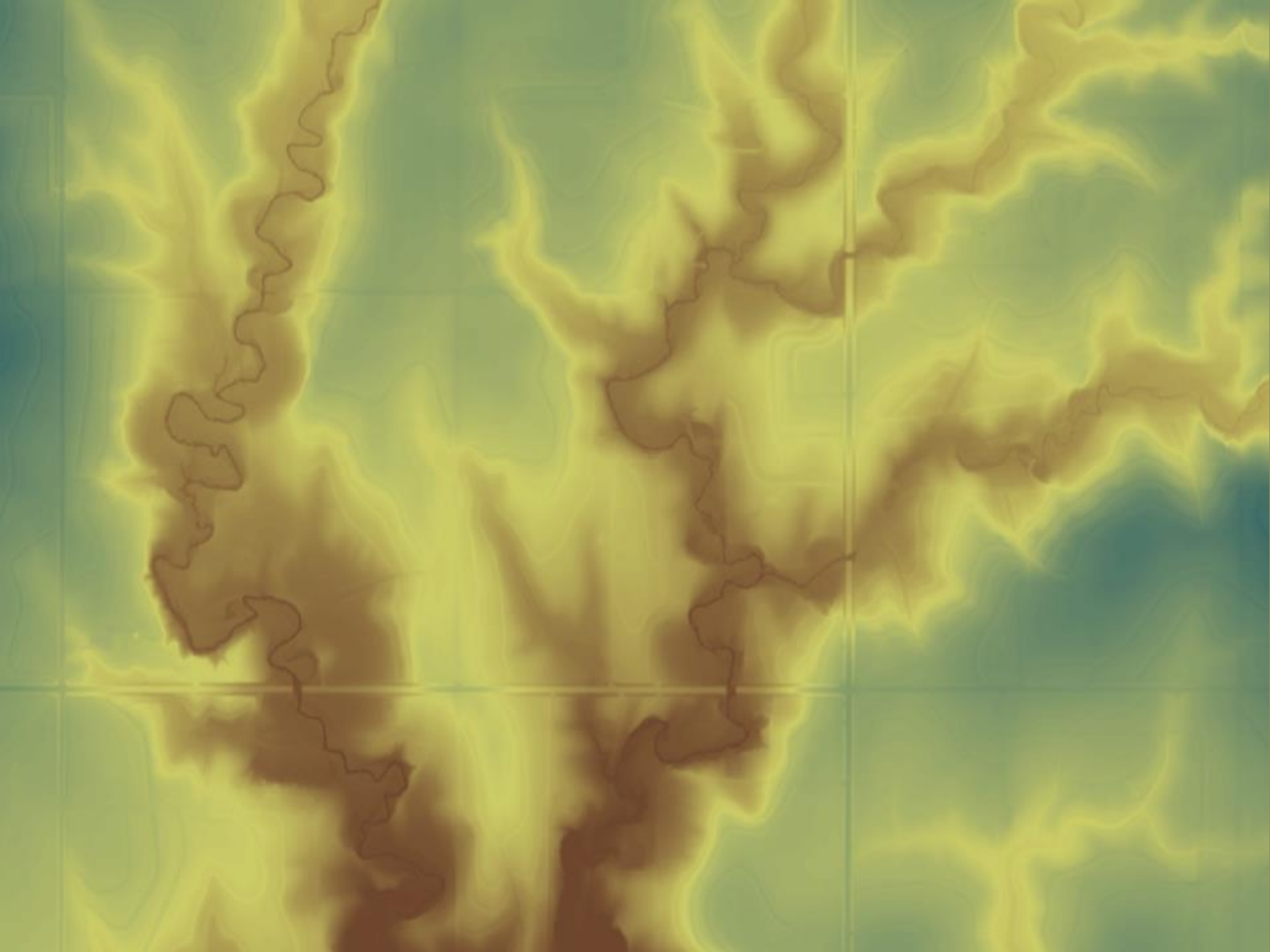
- Risk Mapping Assessment and Planning
- Federal Emergency Management Agency (FEMA) Program that provides communities with flood information and tools they can use to enhance their mitigation plans and take action to better protect their citizens.
- **It's what they call the floodplain mapping program at the moment**

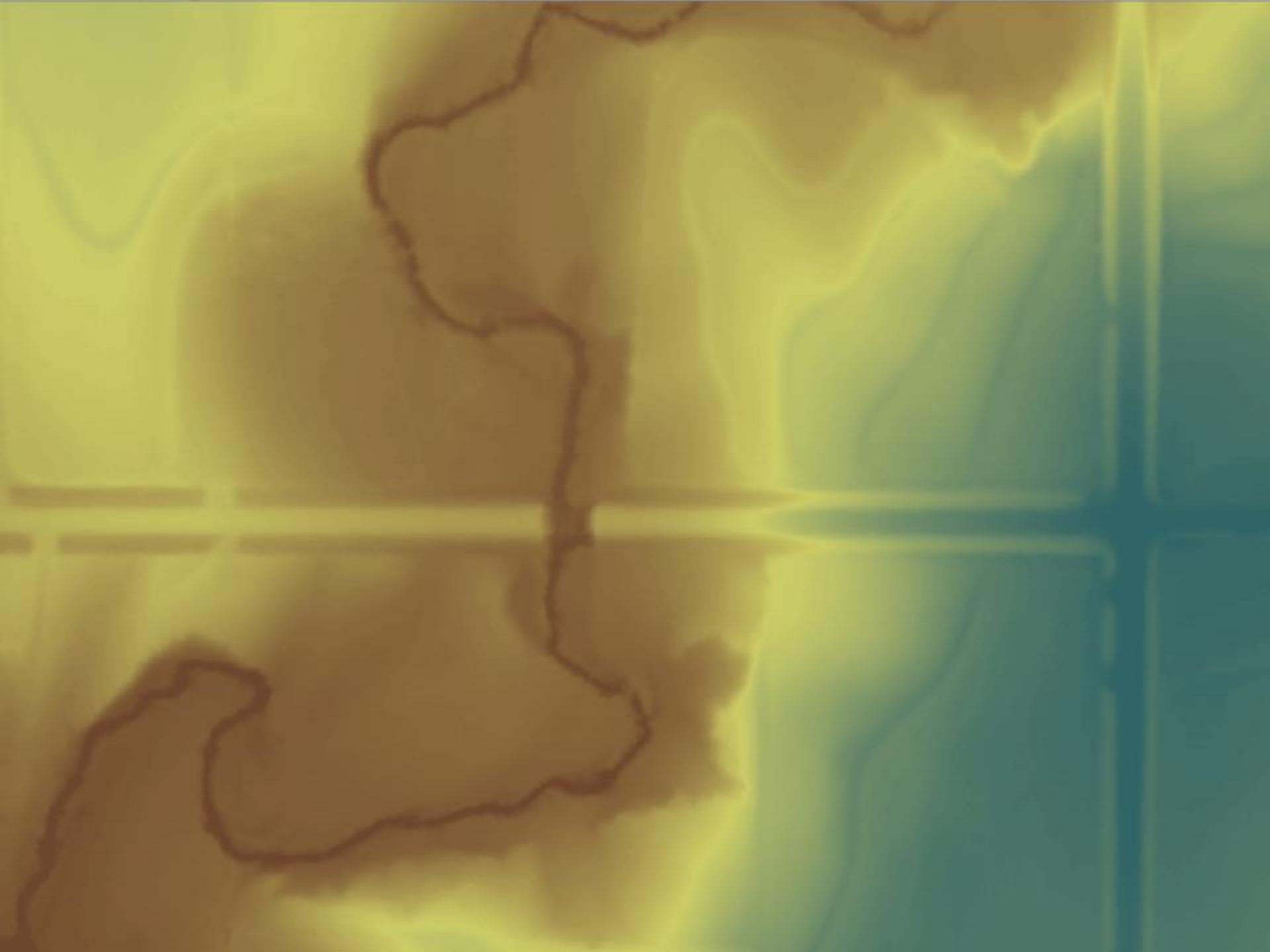
# Why Working Groups?

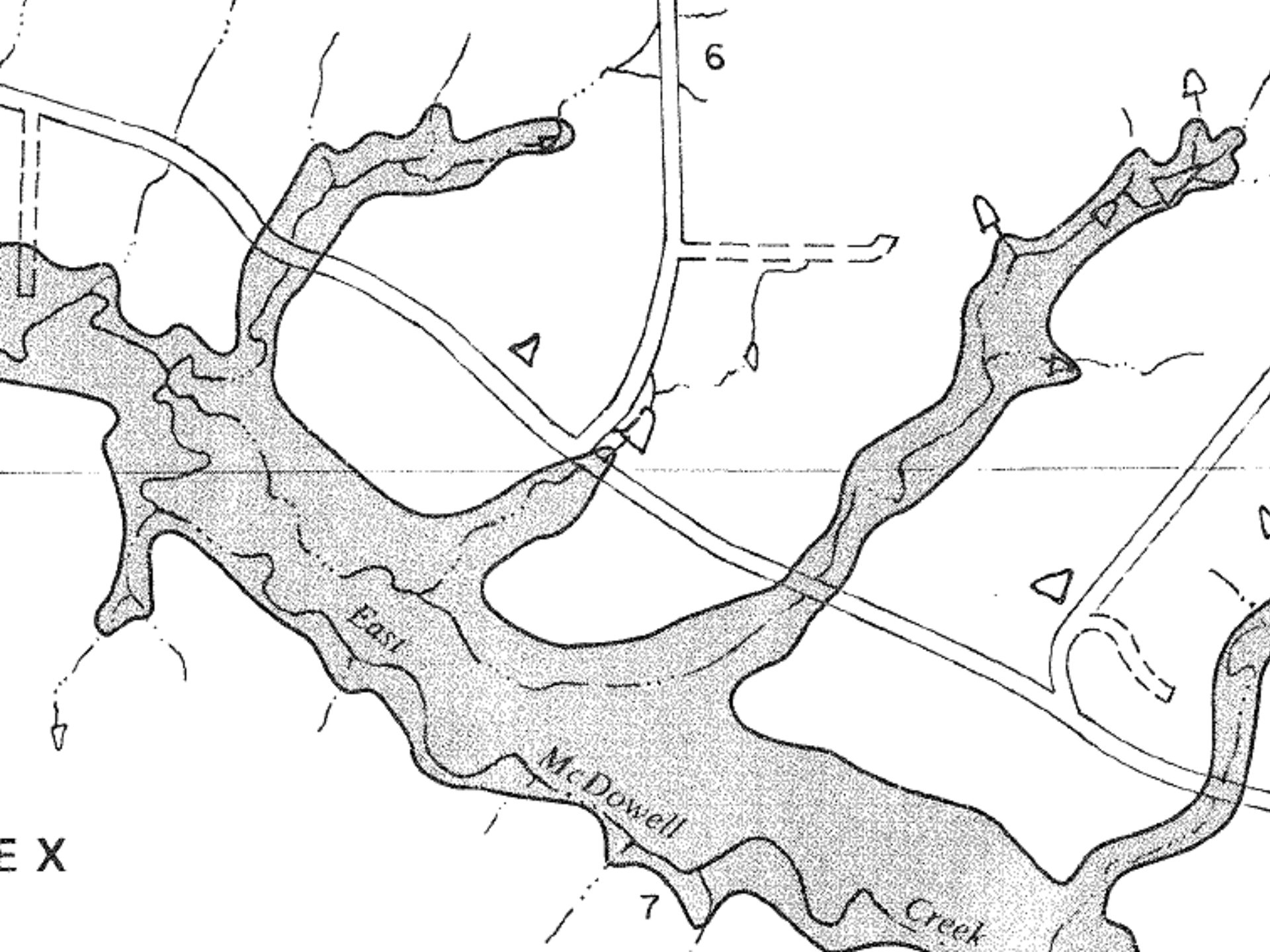
- To ensure your community is represented
- To ensure your residents are aware
- To make the best map possible
- To provide local knowledge and input
- To address problems or inaccuracies early
- To ensure **YOU BELIEVE THE MAP**
- To work towards mitigating risk
- To improve floodplain management locally

# How Will This Map Be Different?

- Methods will be similar to how the Preliminary Map was made
- All New Engineering
  - Modern methodology
- LiDAR Topography
- Non-Regulatory Products (depth grid, WSE grid)







EX





1179.3

1182.7

1188.3

1181.7

1185.3

1198.2

1190.8

1191

1220.1

1200

1205.5

1219.6

1223.2

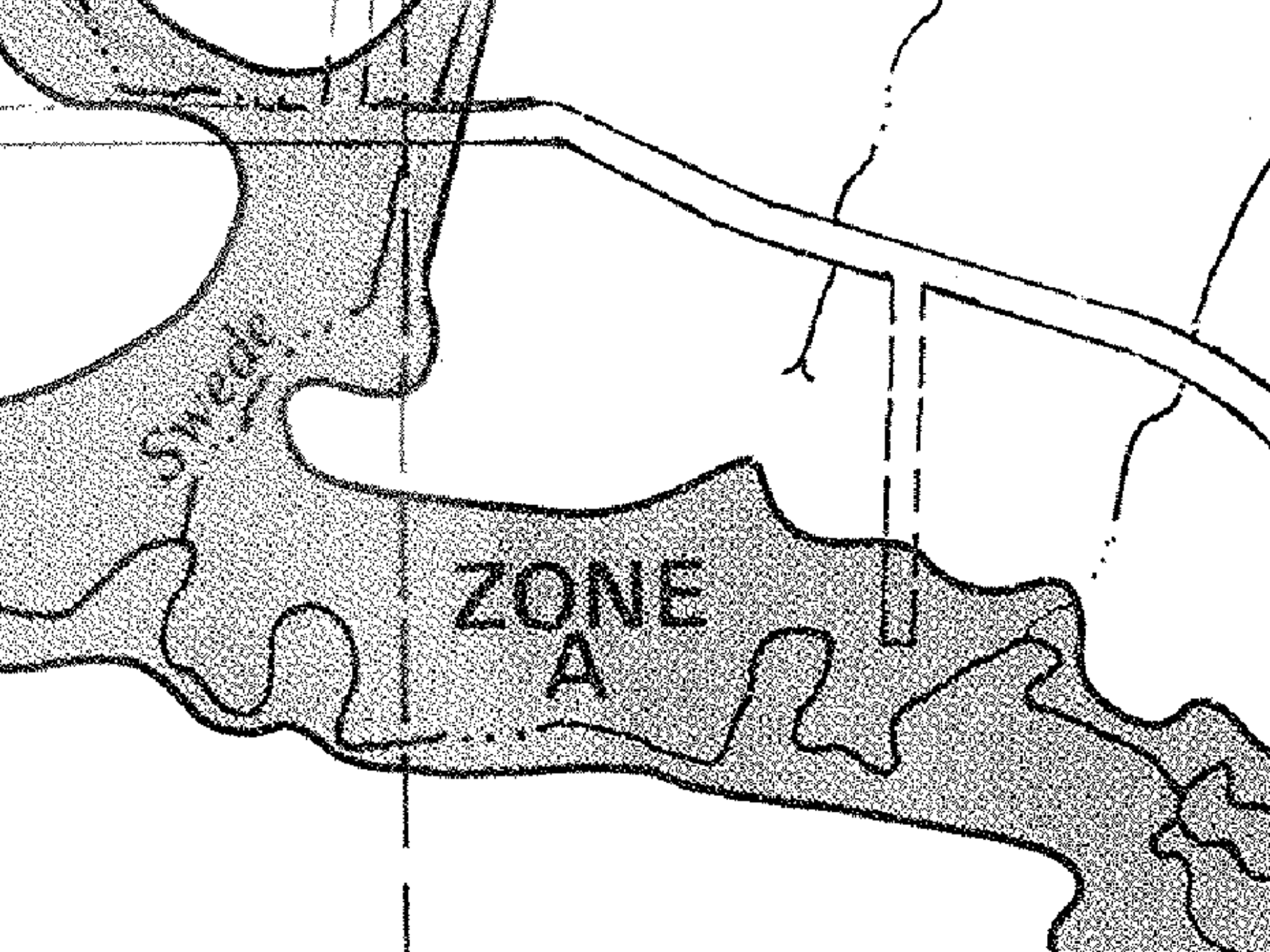
1250.3

1214.3

1202.9

1199.8







1181.4

1176.2

1171.9

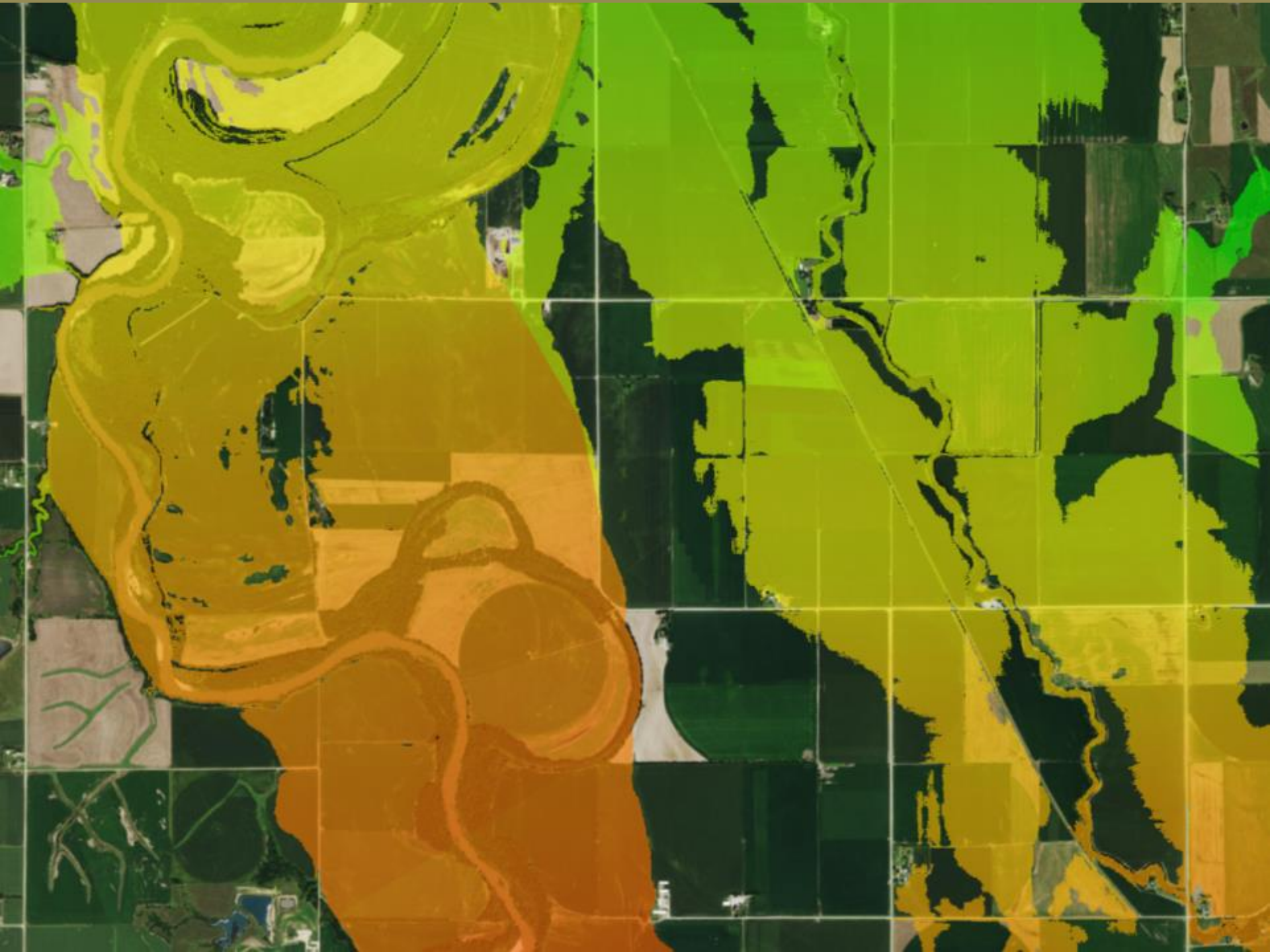




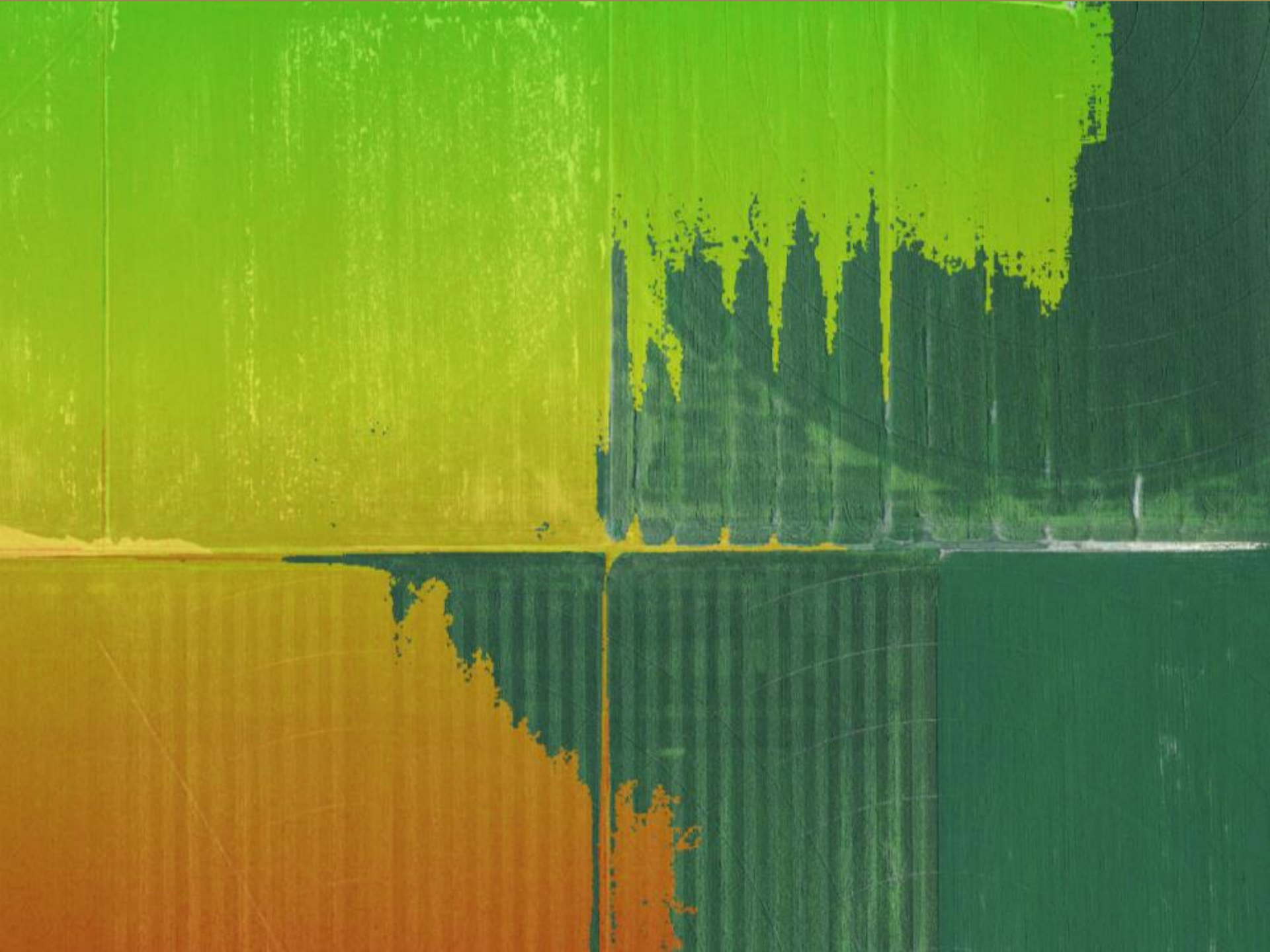




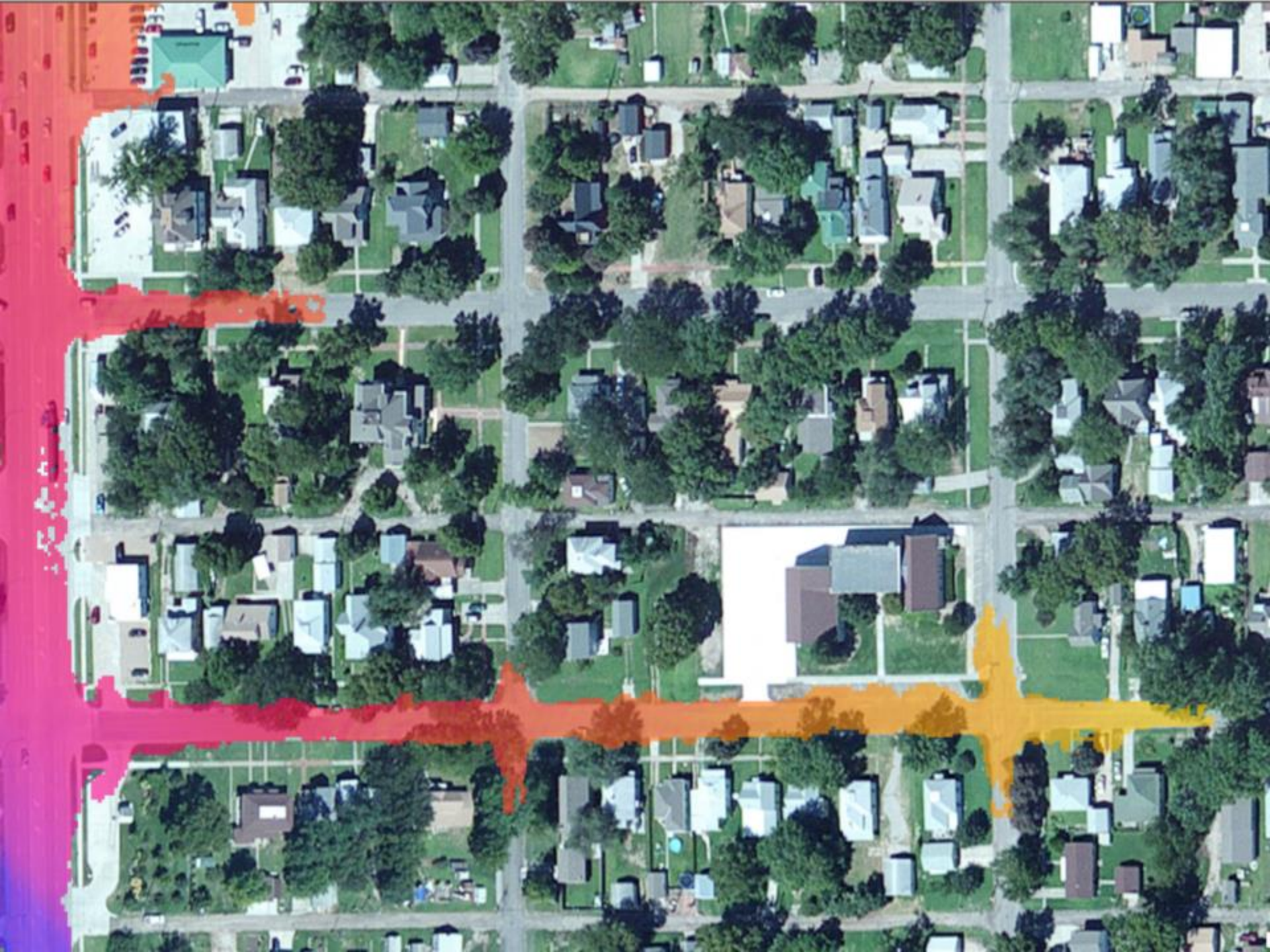
1177.1











# Floodplain Mapping 101





# Basic Terms

- **Base Flood Elevation (BFE)** – The top of water elevation of the 1% flood in a specific location.
- **Flood Insurance Rate Map (FIRM)** – FEMA flood insurance maps
- **Flood Insurance Study (FIS)** – Documents information about flood hazard and the methods used to create a FIRM.
- **Special Flood Hazard Area (SFHA)** – The Regulatory Floodplain (1% Floodplain)

# Basic Terms (Cont)

- **1% Flood (100 year flood)** – Flood with a 1% annual chance of occurring.
- **.2% Flood (500 year flood)**
- **Zone A** – Flood Zone developed with approximate methods.
- **Zone AE** – Flood Zone developed with detailed methods.
- **Zone AH/AO** – Shallow flooding areas from sheetflow or ponding.

# Basic Terms (Cont)

- **H&H** – Hydrology and Hydraulics
- **HEC-RAS** – Hydraulic modeling software developed and updated by the US Corps of Engineers
- **Discharge** – Quantity of water flowing within a stream. Measured in CFS
- **CFS** – Cubic Feet per Second ( $\text{ft}^3/\text{sec}$ )
- **Topography** – Ground surface. Determines the shape of floodplains (LiDAR)
- **Floodway** – Area reserved for flood conveyance

# Data Development Tasks

- Acquire Base Map
- Acquire Topography
- Perform Field Survey
- Develop Hydrologic Data (Hydrology)
- Develop Hydraulic Data (Hydraulics)
- Perform Floodplain Mapping
- Develop DFIRM Database

# Hydrology

## How Much Water

The Hydrology study determines the peak discharge for the 10, 4, 2, 1(-), **1**, 1(+), 0.2% events.

So.....how much water is flowing down the stream during flood events.

# Hydrology Methods

- **Detailed Hydrology**

- **Gage Analysis**

- Statistical analysis of a stream's flow history.
    - What has happened in the past.

- **Rainfall Runoff Modeling**

- Models that mimic the characteristics of a watershed.
      - NWS Rainfall History
      - Infiltration (soils, pervious surfaces)
      - Storage (dams or other sinks)
      - Timing / Routing (how fast does water get from A to B)
      - HEC-HMS (software used for hydrologic modeling)

# Hydrology Methods

- **Approximate Hydrology**

- **Regression**

- Uses equations developed for specific regions to estimate stream discharge.
    - Variables include Drainage Area, Soils, Annual Precipitation

- **Weighted Regression**

- Uses same equations as regular regression
    - Result is compared to results of detailed hydrology in same location or similar location
    - Result is weighted to match detailed results.

# Hydrology

## Storage

- Where will storage be considered in detailed hydrologic modeling?
  - Purpose-built flood control structures
  - Behind County/City owned elevated roadways
  - Where inherent in the methodology
    - Valley storage (gage), Routing Methods(rainfall runoff), unsteady modeling, 2D modeling
- Where will it not be considered?
  - Farm ponds
  - Behind private elevated features



# Hydraulics

## How High The Water Will Get

The Hydraulic study determines the water surface elevations on streams during the 10, 4, 2, 1(-), 1, 1(+), 0.2% events..

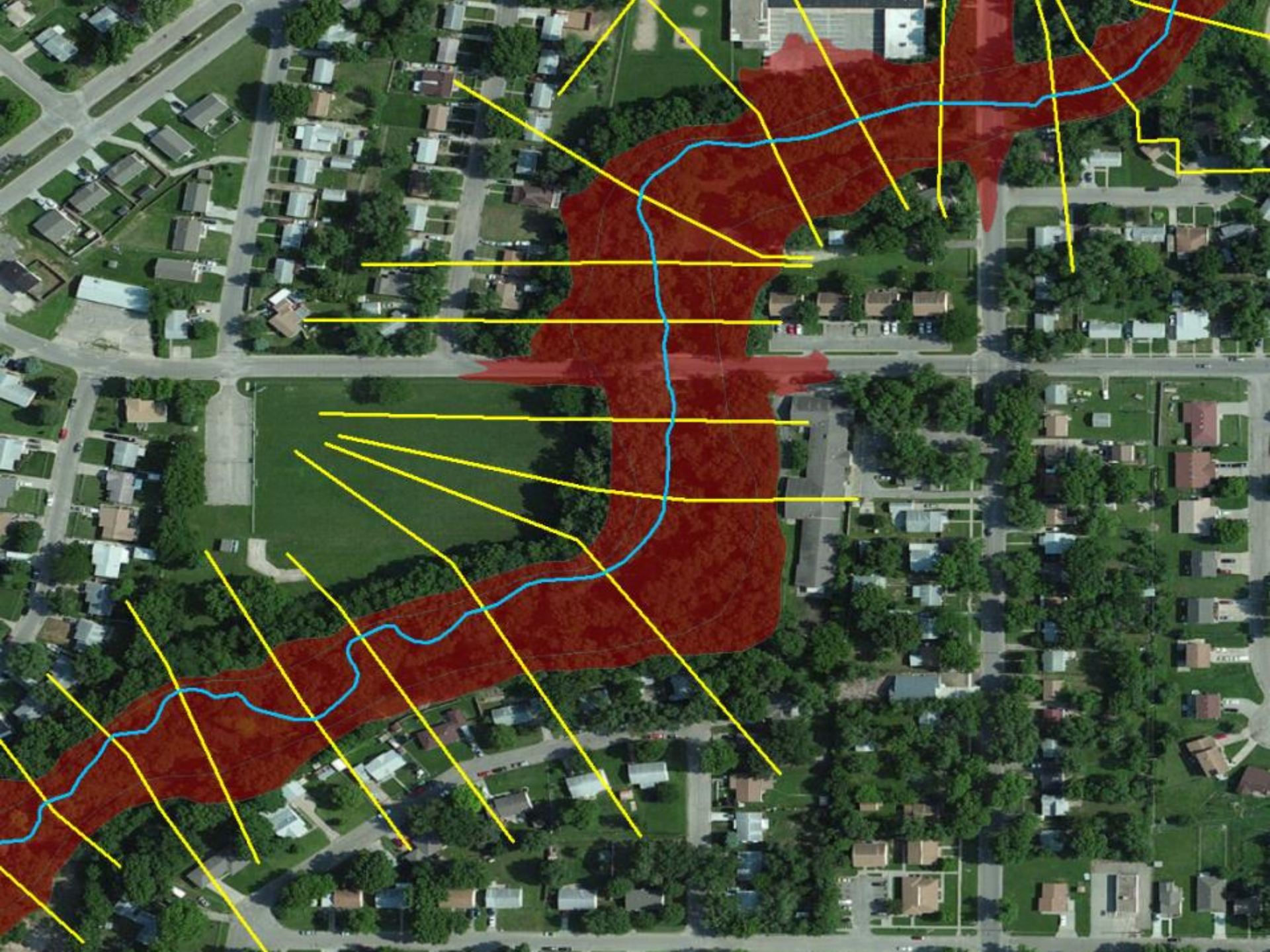
So.....hydraulics models the interaction between the water and the channel/ground surface. Determines where water goes and what the floodplain boundaries will be.

# Hydraulics

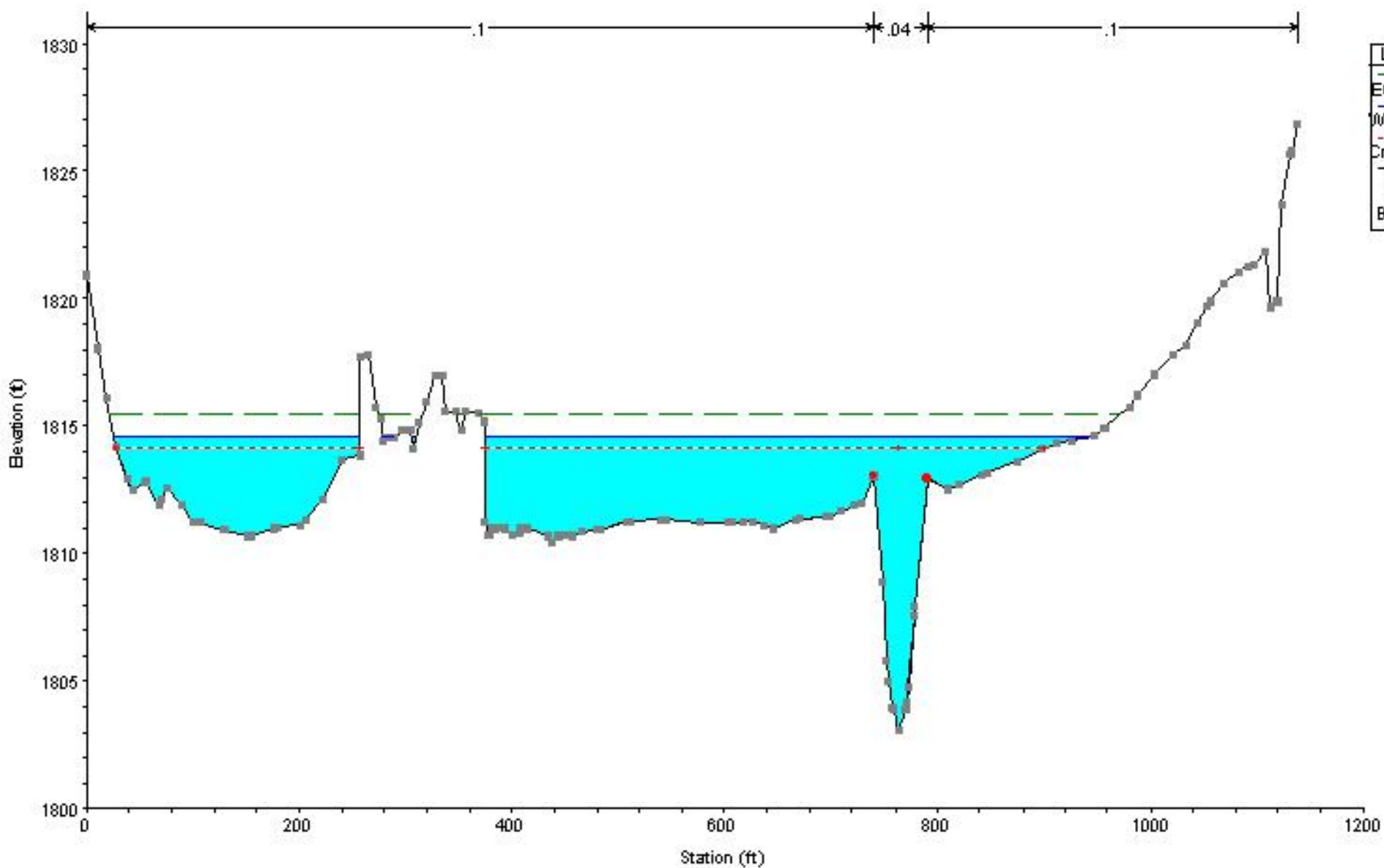
Cross Sections of stream channels are developed at regular intervals along streams and at locations where the channel varies or changes

Variables that will affect the conveyance of water are considered in the model

- Slope, Friction, Structures (culverts and bridges)(detailed studies), Sinuosity, Areas of Non-Conveyance (ineffective flow)







Elevation above Thalweg Base (m)

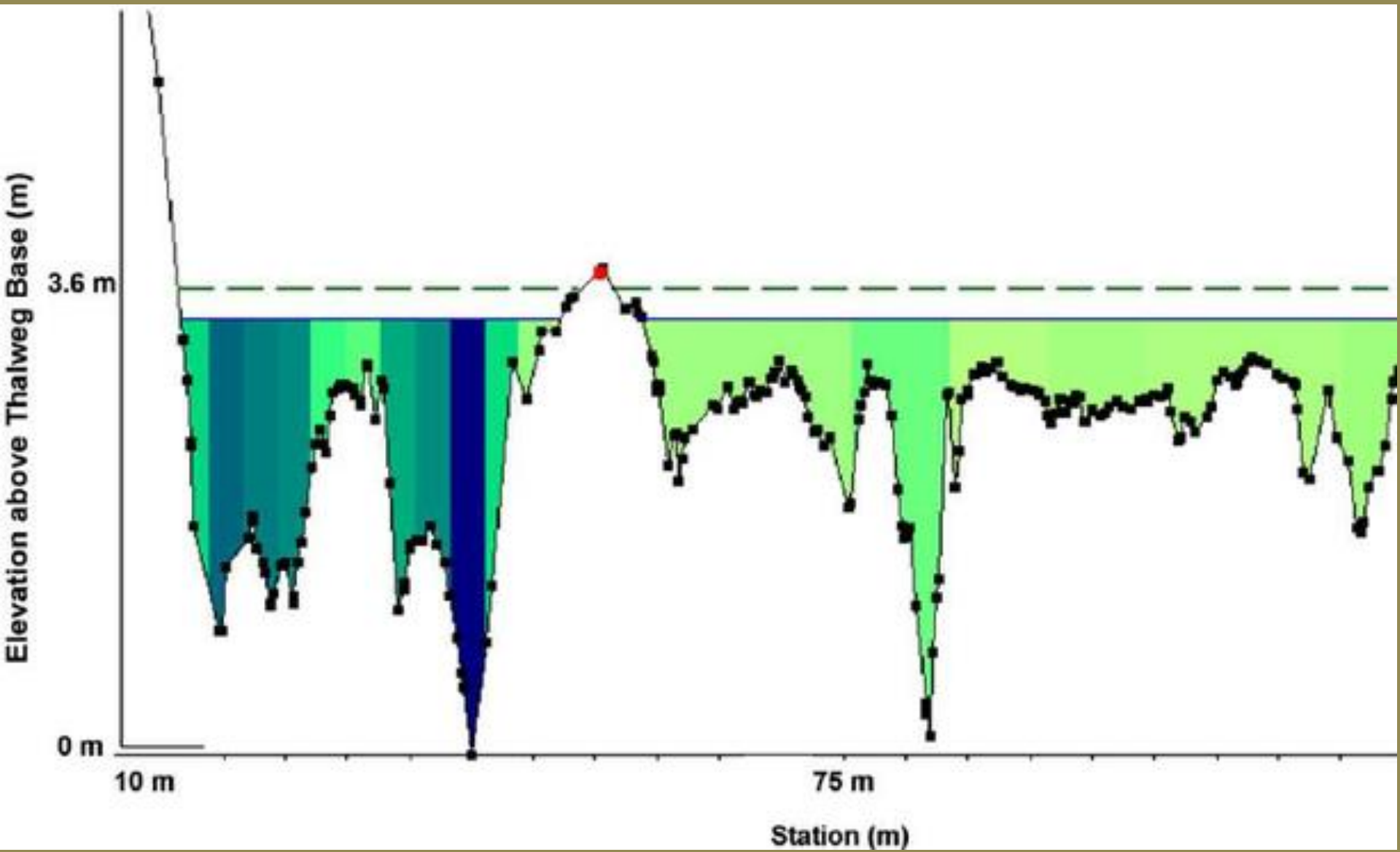
3.6 m

0 m

10 m

75 m

Station (m)



# Hydraulic Methods

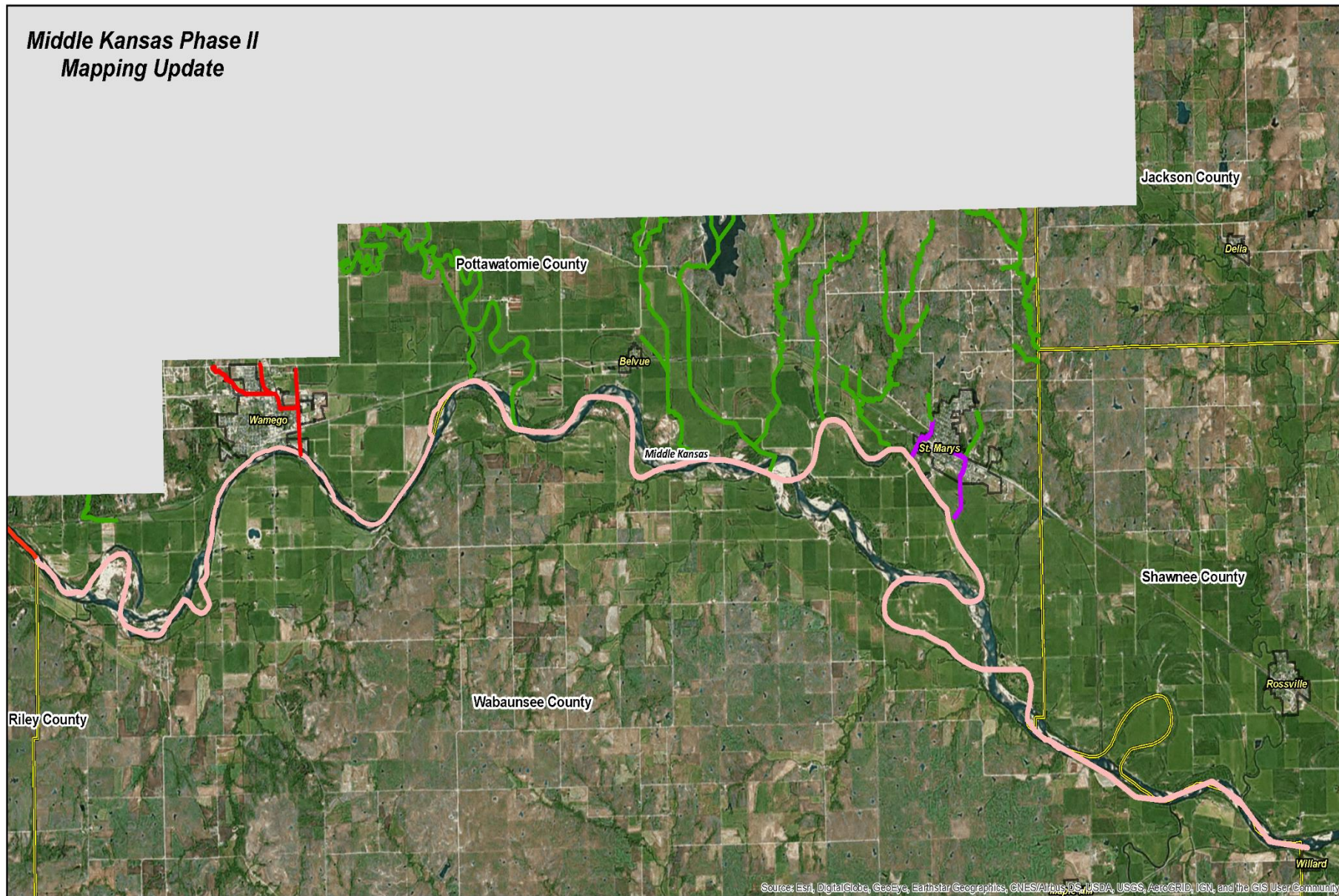
- **Detailed Hydraulics (Zone AE)**
  - Include more Cross Sections (higher density)
  - Structure elevations are surveyed
  - Typically in urban areas
  - More Expensive
- **Limited Detailed Studies (Zone AE)**
  - Structures are field measured
  - No Floodway on map
- **Approximate Hydraulics (Zone A)**
  - Fewer cross sections
  - Structures not included in models
  - Typically in rural areas
  - No Floodways

# Middle Kansas Project Overview

- Kansas River
  - WB & PT Counties
    - Gage – 44 miles
    - Hec-Ras Hydraulic Modeling
- Pottawatomie Panel Updates
  - Detailed Study – 1.7 miles
    - Rainfall Runoff
    - Floodway
    - Hec-Ras Hydraulic Modeling
  - Zone A – 54 miles
    - Regression/Weighted Regression
    - Hec-Ras Hydraulic Modeling



# **Middle Kansas Phase II Mapping Update**



- Recently updated detailed studies
- New Detailed Study will be developed for the Kansas River
- No updated analysis scheduled
- New Zone A studies for these streams
- New Detailed Study will be developed in St. Marys



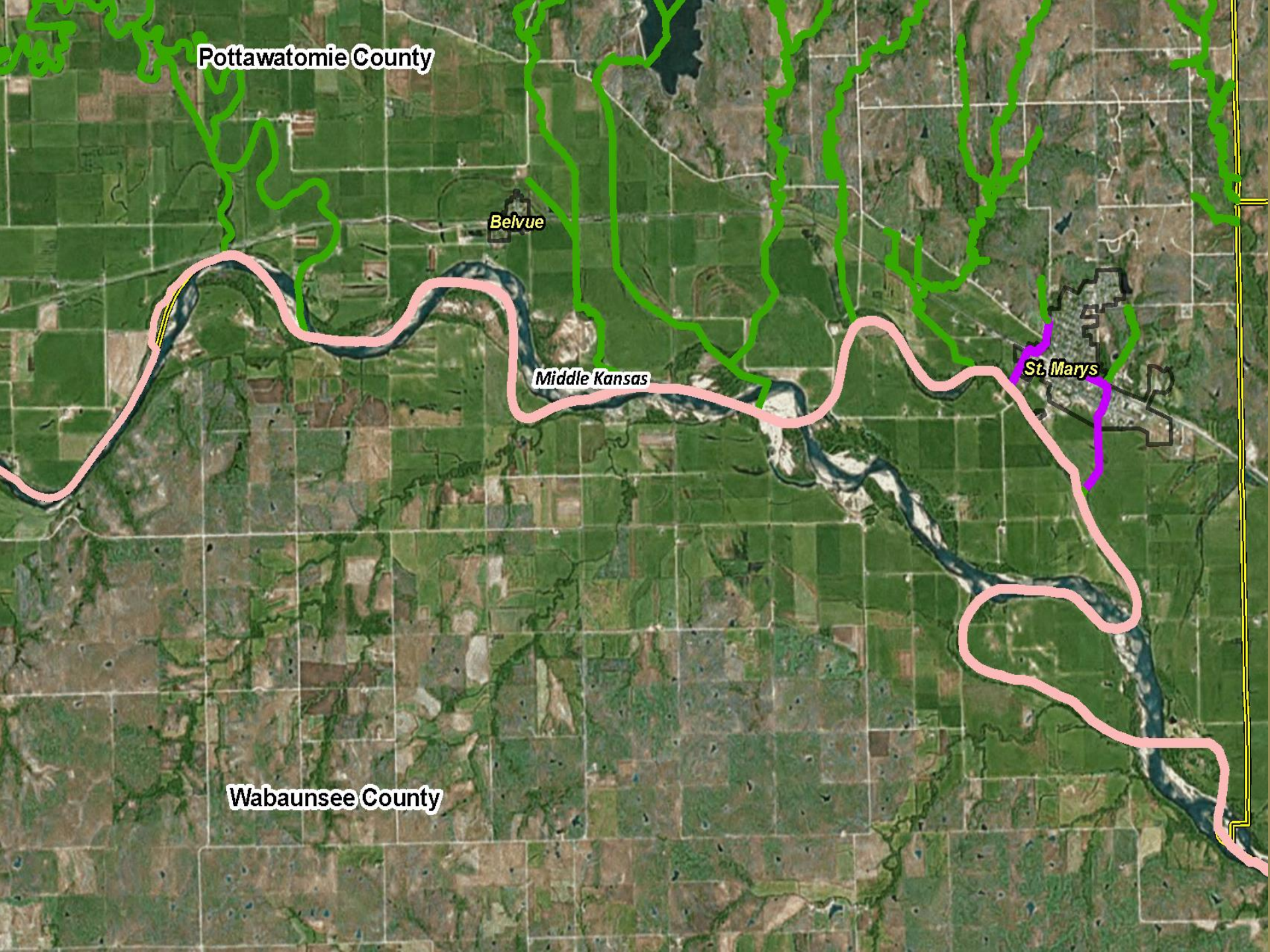
Pottawatomie County

Belvue

Middle Kansas

St. Marys

Wabaunsee County



# LEVEES

- St Marys
  - College Creek
  - Currently unaccredited on FIRM
  - Clear ownership and sponsor?
  - Maintenance and Engineering Concerns
- Belvue
  - Local Drainage tributary to Lost Creek
  - FIRM implies accreditation
  - Clear ownership and sponsor?
  - Maintenance and Engineering Concerns







# Levee Options

- Accredited Structures
  - Significant challenges
  - Expensive
- Natural Valley
  - Maps will not show protection from levee
  - Levee structure will not be considered in modeling
- LAMP
  - Levee Accreditation Mapping Procedure
  - Can give partial credit, but unlikely.

# Levee Timeframe

- Levee accreditation would need to be submitted prior to the end of the project 90-day appeal period (Late 2019?), and accepted prior to the project's approval to move forward with a Letter of Final Determination (LFD) date.
  - Levee accreditation needs to be completed within the project schedule to be included on the map as providing protection.
- Maps can always be changed through the Letter of Map Revision (LOMR) process following the map's effective date.
  - Levee accreditation can be added with a LOMR at a later date.

# Project Scope Review

- Look at and understand the scope planned for your community.
- You have a 30 day period to review and comment on the scope if necessary.
- Is the scope appropriate?
- Are we missing anything?

# Project Phases

- Information Sharing
  - What do you have that we can use???
  - Now
- Data Development
  - Fall 2017 thru Fall 2018
- Community / Public Review
  - Summer 2018 thru late 2018
- Preliminary and Post-Preliminary
  - Early 2019 to 2020



# What Should Working Groups DO?

- Stay aware and answer questions
- Identification of Areas of Concern (first task)
- **ENGINEERING AND MAP REVIEW**
- **PUBLIC REVIEW NOTIFICATION**
  - Inform public of map review opportunity
  - Encourage public participation
- **PLAN PUBLIC OUTREACH**
  - Public Open House
    - When, where, how, get the word out
  - Long Term Outreach

# Preliminary Map Status

- **VERY IMPORTANT!!!!**
  - Things change when status changes from DRAFT to PRELIMINARY.
- **DRAFT = OUR MAP**
  - Changes can be made to mapping through simple cooperation.
- **PRELIM = FEMA's MAP**
  - Changes can only be made through official appeal
- **NEED TO BE SOLID BEFORE PRELIMINARY**
- Preliminary Date Estimate
  - Early 2019
  - We have control over Prelim Date (within reason)

# Post-Preliminary Process

- Post-Prelim lasts 15-18 months in general
- Changes to mapping can only happen during a 90-day appeal period following Prelim status.
- Official meetings with community officials to explain timeline and appeal period. (CCO)
- Letter of Final Determination (LFD)
  - Point at which no more changes can be made
  - “Pencils Down” – map is final
- 6-month official adoption period between LFD and the Effective Date.

# Post-Prelim Working Group Tasks

- Community Outreach
  - Appeal Period Notification
  - Answer Stakeholder Questions
  - Insurance Outreach
    - Newly Mapped Procedure
- Mitigation Planning
  - Community Rating System (CRS)
    - Flood Insurance Discounts
  - Can your community take action to reduce flood risk?
    - Projects?
    - Grant Applications?

# Communication to Working Groups

- Email List
  - Get me names, addresses, and titles
  - Will be main source of project updates
- Project Updates
  - Minimum of quarterly
  - When important milestones are reached
  - When action is necessary (reminders)
- Meetings
  - In person as needed
- Provided Project Material
- **DON'T HESITATE TO CALL, WE ARE AVAILABLE**

# If You Only Remember A Few Things

- Process is going to take time
  - Maps will not be Effective until 2020 or 2021
- **Get it right before Preliminary!**
  - Foster public review next fall
  - Get out the word and encourage participation
- You need ownership of your regulatory map
- I am available to answer your questions

# Q & A

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